

Appl. No. 09/936,185
Final Amendment and/or Response
Reply to final Office action of 11 November 2007

Reply under 37 CFR 1.116
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Amendments to the Claims:

A listing of the entire set of pending claims (including amendments to the claims, if any) is submitted herewith per 37 CFR 1.121. This listing of claims will replace all prior versions, and listings, of claims in the application.

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Listing of Claims:

1. (Previously presented) A method comprising:

determining a packet arrival time of each packet of a received sequence of information signal packets (TS packet) comprising AV information using a packet arrival time counter derived from a local System Time Counter (STC), the received sequence including, at intervals of multiple information signal packets, Program Clock Reference (PCR) information that facilitates locking the local System Time Counter (STC) with the Program Clock Reference (PCR) information,

appending a Packet Arrival Timestamp (PAT) corresponding to the packet arrival time to each packet,

setting the packet arrival time counter at an initial value before receiving a first information signal packet,

determining a first Packet Arrival Timestamp (PAT) of the first information signal packet of the sequence and a second Packet Arrival Timestamp (PAT) of a first information signal packet that includes a Program Clock Reference (PCR) value,

determining a number of counts of the local System Time Clock Counter (STC) between the first and the second Packet Arrival Timestamps (PAT), and

determining a System Time Counter start value (STC-start) by subtracting the number of counts from the Program Clock Reference (PCR) value.

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2. (Previously presented) The method of claim 1, including
storing the received information signal packets with the appended Packet Arrival Time Stamps (PAT) on a recording medium, and
storing the System Time Counter start value (STC-start) as an attribute of the stored received information signal packets with the appended Packet Arrival Time Stamps (PAT).
3. (Previously presented) A method comprising
running a packet arrival time counter derived from a local System Time Counter (STC),
locking the local System Time Counter (STC) to retrieved Program Clock Reference (PCR) information,
retrieving information signal packets and their corresponding Packet Arrival Timestamps (PAT) from a storage medium,
storing a number of retrieved information signal packets,
outputting an information signal packet when the corresponding Packet Arrival Timestamp (PAT) coincides with the packet arrival time counter,
retrieving a System Time Counter start value (STC-start) from the storage medium, and
setting the System Time Counter (STC) with the retrieved System Time Counter start value (STC-start).
4. (Previously presented) The method of claim 3, including inserting Program Clock Reference (PCR) information corresponding to the System Time Counter start value (STC-start).

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5. (Previously presented) A method comprising
running a presentation time counter derived from a local System Time Counter (STC),

locking the local System Time Counter (STC) to retrieved Program Clock Reference (PCR) information corresponding to either a first sequence or a second sequence of information signal packets (TS) comprising A/V information,

retrieving information signal packets and their corresponding Presentation Timestamps (PTS) from a storage medium,

storing a number of retrieved signal information packets,

presenting an information signal packet when the corresponding Presentation Timestamp (PTS) coincides with the presentation time counter,

subtracting a System Time Counter start value (STC-start-2) of the second sequence from a value of the Presentation Timestamp (PTS) of a first information signal packet of the second sequence, and

setting the local System Time Counter (STC) to the value of the System Time Counter start value (STC-start-2).

6. (Canceled)

7. (Previously presented) Apparatus for recording a real time sequence of information signal packets (TS packet) comprising A/V information, on a record carrier, the serial sequence comprising at intervals of multiple information signal packets, Program Clock Reference (PCR) information for locking a local System Time Counter (STC) with the Program Clock Reference (PCR) information, the apparatus comprising

receiving means for receiving the information signal packets,

time stamp generating means for generating a time stamp corresponding to an arrival time of the information signal packets,

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writing means for recording the generated time stamps and information signal packets on the record carrier, the time stamp generating means provided with a system time counter locked to the received program clock reference (PCR) information, wherein

the time stamp generating means are adapted to generate time stamps according to the method of claim 1.

8. (Previously presented) Apparatus for reproducing a real time sequence of information signal packets (TS packet) comprising A/V information recorded on a record carrier the apparatus comprising

reading means for reading the information signal packets recorded on the record carrier,

storing means for temporarily storing a number of information signal packets read from the record carrier,

time stamp generation means comprising a Packet Arrival Time counter derived from a local System Time Counter (STC),

comparator means for comparing a stored time stamp of an information signal packet with the generated Packet Arrival Time value,

outputting an information signal packet from the storing means when a Packet Arrival Time Counter value coincides with the corresponding time stamp, characterized in that,

the time stamp generating means are adapted to generate a Packet Arrival Time according to the method of claim 3.

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9. (Previously presented) Method of storing a real time sequence of information signal packets comprising A/V information, on a record carrier, the sequence comprising Program Clock Reference (PCR) information for locking a local System Time Counter (STC), Presentation Time Stamp (PTS) information for determining the presentation time of the information comprised in the information signal packets, Decoding Time Stamp (DTS) information for determining the decoding time of the information comprised in the information signal packets, and Packet Identification (PID) mapping information, the method comprising:

adding mark points at specific entry points in the sequence,

storing the mark point and one or more of the following information entities:

Program Clock Reference (PCR) information, Presentation Time Stamp (PTS) information, Decoding Time Stamp (DTS) information, and Packet Identification (PID) mapping information.

10. (Previously presented) The method of claim 9, wherein the entry points include I-frames in an MPEG sequence of encoded frames.

11. (Previously presented) The method of claim 1, wherein the received sequence corresponds to a sequence of MPEG encoded frames.

12. (Previously presented) The method of claim 3, wherein the received sequence corresponds to a sequence of MPEG encoded frames.

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13. (Previously presented) A system comprising:

a receiver that is configured to receive a sequence of information signal packets, the received sequence including, at intervals of multiple signal packets, program clock reference information,

a timestamp generator that is configured to provide a packet arrival timestamp corresponding to each information signal packet,

a combiner that is configured to append the packet arrival timestamp to each corresponding information signal packet, and

a packet detector that is configured to detect a program clock reference value in a clock referencing information signal packet that includes program clock reference information,

wherein

the timestamp generator is configured to provide a system time start value based on the program clock reference value and a time difference between the clock referencing information signal packet and an initial information signal packet, and

the combiner is configured to associate the system start time with the sequence of information packets.

14. (Previously presented) The system of claim 13, including a writer that is configured to write the sequence of information packets with appended packet arrival timestamps and associated system start time to a recording medium.

15. (Previously presented) The system of claim 14, wherein the sequence of information packets correspond to a sequence of MPEG-encoded packets, and the system start time is recorded as a segment attribute.

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16. (Previously presented) The system of claim 13, wherein the timestamp generator includes

an oscillator,

a system counter, operably coupled to the oscillator, that is configured to provide a local clock reference,

a phase detector that is configured to control an output of the oscillator based on a comparison of the local clock reference to the program clock reference value, and

a packet timestamp generator, operably coupled to the output of the oscillator, that is configured to provide the packet arrival timestamps.

17. (Previously presented) A system comprising:

a reader that is configured to read a sequence of information packets and an associated system start time, each packet of the sequence of information packets including a corresponding packet arrival timestamp, and select packets including a program clock reference value,

a buffer that is configured to store the sequence of information packets, and

a controller that is configured to control an output of the buffer to provide the sequence of information packets in a time sequence that is dependent upon the system start time and the packet arrival timestamps.

18. (Previously presented) The system of claim 17, including

a timestamp generator that is configured to provide a local timestamp for each information packet based on the system start time,

wherein,

the controller is configured to provide the output of the buffer based on a comparison of the local timestamp and the packet arrival timestamp of each information packet.

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19. (Previously presented) The system of claim 18, including a demultiplexer, operably coupled to the controller and the timestamp generator, that is configured to extract the system start time, the program clock reference value, and the packet arrival timestamps from the sequence of information packets.

20. (Previously presented) The system of claim 18, wherein the timestamp generator includes

an oscillator,

a system counter, operably coupled to the oscillator, that is configured to provide a local clock reference,

a phase detector that is configured to control an output of the oscillator based on a comparison of the local clock reference to the program clock reference value, and

a packet timestamp generator, operably coupled to the output of the oscillator, that is configured to provide the local timestamps,

wherein

the controller is configured to set the system counter to an initial value corresponding to the system start time.

21. (Previously presented) The method of claim 5, wherein the first and second sequences correspond to sequences of MPEG-encoded frames.